Part 1

Linear Systems

SoE1.tex

Exercise 1 *Solve the given system using substitution and/or elimination. Classify the system as having one solution, no solutions, or infinite solutions. Check your answer both algebraically and graphically.*

$$\begin{cases} x + 2y &= 5 \\ x &= 6 \end{cases}$$

Exercise 1.1 *Classify this system as having one solution, no solutions, or infinite solutions.*

Multiple Choice:

(a) *one solution* ✓

(b) *no solutions*

(c) *infinite solutions*

Exercise 1.1.1 *The solution to this system is* $\left(\boxed{6}, \boxed{-\frac{1}{2}}\right)$.

SoE2.tex

Exercise 2 *Solve the given system using substitution and/or elimination. Classify the system as having one solution, no solutions, or infinite solutions. Check your answer both algebraically and graphically.*

$$\begin{cases} 2y - 3x &= 1 \\ y &= -3 \end{cases}$$

Exercise 2.1 *Classify this system as having one solution, no solutions, or infinite solutions.*

Multiple Choice:

(a) *one solution* ✓

(b) *no solutions*

(c) *infinite solutions*

Exercise 2.1.1 *The solution to this system is* $\left(\boxed{-\frac{7}{3}}, \boxed{-3}\right)$.

SoE3.tex

Exercise 3 *Solve the given system using substitution and/or elimination. Classify the system as having one solution, no solutions, or infinite solutions. Check your answer both algebraically and graphically.*

$$\begin{cases} \dfrac{x+2y}{4} &= -5 \\ \dfrac{3x-y}{2} &= 1 \end{cases}$$

Exercise 3.1 *Classify this system as having one solution, no solutions, or infinite solutions.*

Multiple Choice:

(a) *one solution* ✓

(b) *no solutions*

(c) *infinite solutions*

Exercise 3.1.1 *The solution to this system is* $\left(\boxed{-\frac{16}{7}}, \boxed{-\frac{62}{7}}\right)$.

SoE4.tex

Exercise 4 *Solve the given system using substitution and/or elimination. Classify the system as having one solution, no solutions, or infinite solutions. Check your answer both algebraically and graphically.*

$$\begin{cases} \frac{2}{3}x - \frac{1}{5}y &= 3 \\ \frac{1}{2}x + \frac{3}{4}y &= 1 \end{cases}$$

Exercise 4.1 *Classify this system as having one solution, no solutions, or infinite solutions.*

Multiple Choice:

(a) *one solution* ✓

(b) *no solutions*

(c) *infinite solutions*

Exercise 4.1.1 *The solution to this system is* $\left(\boxed{\frac{49}{12}}, \boxed{-\frac{25}{18}}\right)$.

SoE5.tex

Exercise 5 *Solve the given system using substitution and/or elimination. Classify the system as having one solution, no solutions, or infinite solutions. Check your answer both algebraically and graphically.*

$$\begin{cases} \frac{1}{2}x - \frac{1}{3}y &= -1 \\ 2y - 3x &= 6 \end{cases}$$

Exercise 5.1 *Classify this system as having one solution, no solutions, or infinite solutions.*

Multiple Choice:

(a) *one solution*

(b) *no solutions*

(c) *infinite solutions* ✓

SoE6.tex

Exercise 6 *Solve the given system using substitution and/or elimination. Classify the system as having one solution, no solutions, or infinite solutions. Check your answer both algebraically and graphically.*

$$\begin{cases} x + 4y &= 6 \\ \frac{1}{12}x + \frac{1}{3}y &= \frac{1}{2} \end{cases}$$

Exercise 6.1 *Classify this system as having one solution, no solutions, or infinite solutions.*

Multiple Choice:

(a) *one solution*

(b) *no solutions*

(c) *infinite solutions* ✓

SoE7.tex

Exercise 7 *Solve the given system using substitution and/or elimination. Classify the system as having one solution, no solutions, or infinite solutions. Check your answer both algebraically and graphically.*

$$\begin{cases} 3y - \frac{3}{2}x &= -\frac{15}{2} \\ \frac{1}{2}x - y &= \frac{3}{2} \end{cases}$$

Exercise 7.1 *Classify this system as having one solution, no solutions, or infinite solutions.*

Multiple Choice:

(a) *one solution*

(b) *no solutions* ✓

(c) *infinite solutions*

SoE8.tex

Exercise 8 *Solve the given system using substitution and/or elimination. Classify the system as having one solution, no solutions, or infinite solutions. Check your answer both algebraically and graphically.*

$$\begin{cases} \frac{5}{6}x + \frac{5}{3}y &= -\frac{7}{3} \\ -\frac{10}{3}x - \frac{20}{3}y &= 10 \end{cases}$$

Exercise 8.1 *Classify this system as having one solution, no solutions, or infinite solutions.*

Multiple Choice:

(a) *one solution*

(b) *no solutions* ✓

(c) *infinite solutions*

SoE9.tex

Exercise 9 *A local buffet charges* \$7.50 *per person for the basic buffet and* \$9.25 *for the deluxe buffet (which includes crab legs.) If 27 diners went out to eat and the total bill was* \$227.00 *before taxes, how many chose the basic buffet and how many chose the deluxe buffet?*

Answer: $\boxed{13}$ *chose the basic buffet and* $\boxed{14}$ *chose the deluxe buffet.*

SoE10.tex

Exercise 10 *At The Old Home Fill'er Up and Keep on a-Truckin' Cafe, Mavis mixes two different types of coffee beans to produce a house blend. The first type costs \$3 per pound and the second costs \$8 per pound. How much of each type does Mavis use to make 50 pounds of a blend which costs \$6 per pound?*

Answer: Mavis needs $\boxed{20}$ *pounds of \$3 per pound coffee and* $\boxed{30}$ *pounds of \$8 per pound coffee.*

`SoE11.tex`

Exercise 11 *Skippy has a total of \$10,000 to split between two investments. One account offers 3% simple interest, and the other account offers 8% simple interest. For tax reasons, he can only earn \$500 in interest the entire year. How much money should Skippy invest in each account to earn \$500 in interest for the year?*

Answer: Skippy needs to invest $\$\boxed{6000}$ *in the 3% account and* $\$\boxed{4000}$ *in the 8% account.*

`SoE12.tex`

Exercise 12 *A 10% salt solution is to be mixed with pure water to produce 75 gallons of a 3% salt solution. How much of each are needed?*

Answer: $\boxed{22.5}$ *gallons of the 10% solution and* $\boxed{52.5}$ *gallons of pure water.*

`SoE13.tex`

Exercise 13 *At The Crispy Critter's Head Shop and Patchouli Emporium along with their dried up weeds, sunflower seeds and astrological postcards they sell an herbal tea blend. By weight, Type I herbal tea is 30% peppermint, 40% rose hips and 30% chamomile, Type II has percents 40%, 20% and 40%, respectively. How much of each Type of tea is needed to make a new blend of tea that is equal parts peppermint, rose hips and chamomile?*

Exercise 13.1 *First, assume you want to make 12 pounds of the new blend of tea. How much of each type would you need?*

Answer: $\boxed{8}$ *pounds of Type I,* $\boxed{4}$ *pounds of Type II.*

Exercise 13.1.1 *Now, assume you want to make 2 pounds of the new blend of tea. How much of each type would you need?*

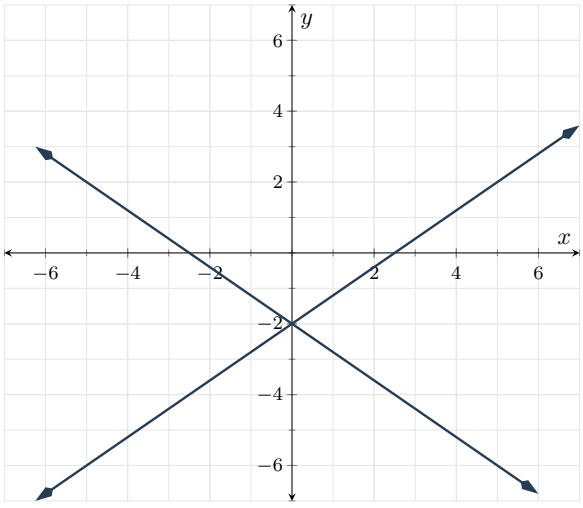
Answer: $\boxed{\frac{4}{3}}$ *pounds of Type I,* $\boxed{\frac{2}{3}}$ *pounds of Type II.*

Exercise 13.1.1.1 *Now, let t be the amount of the new tea you would like to make in pounds. How much of each type would you need? (Your answer will depend on t).*

Answer: $\boxed{\frac{2}{3}t}$ *pounds of Type I,* $\boxed{\frac{1}{3}t}$ *pounds of Type II.*

`SoE14.tex`

Exercise 14 *The following system of equations is given graphically. Determine if the system has one solution, no solutions, or infinite solutions.*



Exercise 14.1 *Classify this system as having one solution, no solutions, or infinite solutions.*

Multiple Choice:

(a) *one solution* ✓

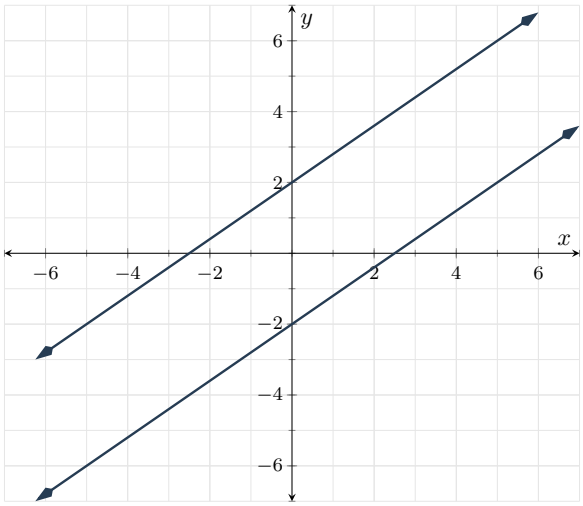
(b) *no solutions*

(c) *infinite solutions*

Exercise 14.1.1 *The solution to this system is* $\left(\boxed{0}, \boxed{-2}\right)$.

`SoE15.tex`

Exercise 15 *The following system of equations is given graphically. Determine if the system has one solution, no solutions, or infinite solutions.*



Exercise 15.1 *Classify this system as having one solution, no solutions, or infinite solutions.*

Multiple Choice:

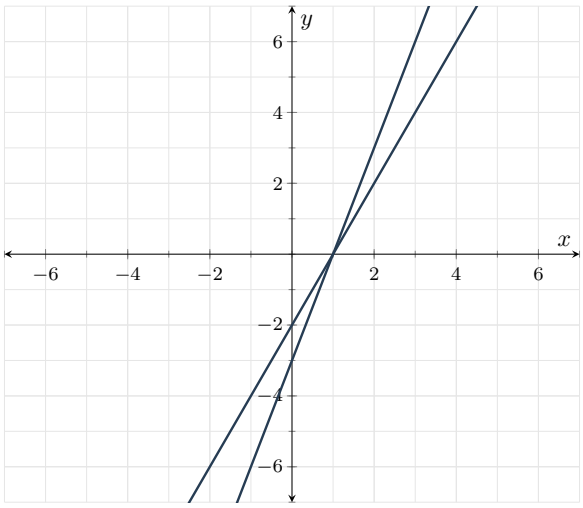
(a) *one solution*

(b) *no solutions* ✓

(c) *infinite solutions*

`SoE16.tex`

Exercise 16 *The following system of equations is given graphically. Determine if the system has one solution, no solutions, or infinite solutions.*



Exercise 16.1 *Classify this system as having one solution, no solutions, or infinite solutions.*

Multiple Choice:

(a) *one solution* ✓

(b) *no solutions*

(c) *infinite solutions*

Exercise 16.1.1 *The solution to this system is* $\left(\boxed{1}, \boxed{0}\right)$.